View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Elsevier - Publisher Connector

Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 102 (2016) 648 – 653

Procedia Computer Science

12th International Conference on Application of Fuzzy Systems and Soft Computing, ICAFS 2016, 29-30 August 2016, Vienna, Austria

Statistical analysis of internet banking usage with logistic regression

Berna Serener*

[*] *Department of Human Resource Management, Near East University, Nicosia, North Cyprus, Mersin 10, Turkey*

Abstract

Internet banking is an important phenomenon in the contemporary banking industry. The purpose of this paper is to analyze the characteristics of internet banking users in Northern Cyprus. 483 respondents were surveyed. Logistic regression was used to evaluate the impact of age, gender, income, marital status, education, profession, comfort level with computers and previous experience of shopping online on the likelihood of people using internet banking. The results indicate that 56-65 year olds were less likely to adopt internet banking than 18-25 year olds. The odds of adopting internet banking were higher for male respondents compared to females. Married individuals were less likely to adopt internet banking than single respondents were. The likelihood of adopting internet banking rose with increasing levels of income. Respondents with master's or PhD degrees were more likely to adopt internet banking compared to primary and secondary school graduates. Respondents who have previously shopped online and have a high comfort level with computers had a greater tendency towards adopting internet banking. Sole proprietors, public sector workers, private sector workers and students were less likely to adopt internet banking than banking personnel.

© 2016 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Peer-review under responsibility of the Organizing Committee of ICAFS 2016

*Keywords:*Internet banking; North Cyprus; logistic regression; demographic variables.

1. Introduction

Internet banking has become an important phenomenon with the rapid development of the internet. In an attempt to increase the diffusion of internet banking, several studies have been performed. Some of these studies examined the relationship between certain factors and the intention to use internet banking[1,6,17]. Variables such as perceived ease of use, perceived usefulness, perceived risk, internet banking competence, perceived playfulness, social

* Corresponding author. Tel.: +90-392-6751000 Ext: 3110; fax: +90-392-2236461.
E-mail address: berna.serener@neu.edu.tr

1877-0509 © 2016 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Peer-review under responsibility of the Organizing Committee of ICAFS 2016
doi:10.1016/j.procs.2016.09.456

influences and trust have been employed in these studies. The relationship between demographic variables such as age, gender, marital status and the intention to use internet banking have been examined in other studies[3,4]. The purpose of this paper is to analyze the characteristics of internet banking users in Northern Cyprus. Variables used are age, gender, income, marital status, education, profession, comfort level with computers and previous experience of shopping online. To the best knowledge of the author, this is the first such study carried out in Northern Cyprus.

2. Literature Review

In New Zealand Gan and Clemes study showed that internet banking users were younger than non-users[3]. Li and Lai suggested that males had a significantly higher intention to use internet banking than females1[2].

In Poland, the duration of internet banking usage, usage of internet at work and previous experience with internet transactions were used to examine whether or not familiarity with the internet increased the likelihood of internet banking adoption. Polasik and Wisniewski concluded that familiarity with the internet medium positively affected the probability of using internet banking[14]. In a study done in Austria, familiarity of the internet also had a positive effect on the attitudes toward internet banking[9].

Devlin and Yeung suggested that internet banking users were younger, had better education and had higher incomes compared to non-users[2].

Venkatesh argued that computer self-efficacy was an antecedent of perceived ease of use[16]. Perceived ease of use affected both the perceived usefulness and behavioral intention to use information technologies. Karajaluoto et al suggested that prior experience with computers positively affected the intention to use internet banking[7]. Laforet and Li concluded that internet banking users had more computer experience than non-users[10].

Kolodinsky et al concluded that mature respondents were less likely to adopt PC and phone banking while higher income individuals had an increased chance of adoption[8]. Married couples were more likely to adopt than single individuals.

Lassar et al concluded that income had a significantly positive relationship with online banking in the United States[11]. In Brazil, Hernandez and Mazzon concluded that internet banking adopters were younger and more educated[5]. According to Ozdemir et al internet banking adopters had a higher income compared to non-adopters in Turkey[13].

Serener, B argued that the risk perceptions of banking personnel were lower than other professional groups, which meant that banking personnel were more willing to adopt internet banking[15].

In the light of the aforementioned discussion, we propose that:

H1: Younger individuals are more likely to adopt internet banking
H2: Males are more likely to adopt internet banking
H3: Higher income individuals are more likely to adopt internet banking
H4: Married couples are more likely to adopt internet banking
H5: Educated individuals are more likely to adopt internet banking
H6: Banking personnel are more likely to adopt internet banking
H7: An increased comfort level with computers increases the likelihood of internet banking adoption
H8: Previous online shopping experience increases the chance of internet banking adoption

Table 1. Demographic characteristics of respondents

Variable (n= 483)	Frequency	Percent (%)
Age		
18 - 25	114	23.2
26 - 35	165	34.2
36 - 45	125	25.9
46 - 55	61	12.6
56 - 65	18	3.7
Gender		
Female	253	52.4
Male	230	47.6

Nationality		
Turkish Cypriot	328	67.9
Turkish	92	19
Other	63	13
Income		
0 – 1,500TL	96	19.9
1,501 – 3,000 TL	193	40
>3,001 TL	194	40.2
Marital Status		
Single	233	48.2
Married	250	51.8
Education		
Primary and Secondary School	34	7
High School	146	30.2
2 Year University	18	3.7
University	212	43.9
Master's or Ph.D.	73	15.1
Profession		
Sole Proprietor	34	7
Public Sector Worker	142	29.4
Private Sector Worker	136	28.2
Retired	32	6.6
Student	92	19
Banking Personnel	47	9.7
TL = Turkish Lira		

Table 2. Internet Banking Usage and Online Shopping of Respondents

Items (n=483)	Frequency	Percent (%)
Do you use internet banking?		
No	231	47.8
Yes	252	52.2
Have you ever shopped online?		
No	346	71.6
Yes	137	28.4

Table 3. Comfort level with computers

	Min	Max	Mean	Std. Deviation
Comfort level with computers	1	7	5.37	1.55

Table 4. Logistic regression model predicting internet banking usage

Variable	β	SE	Wald	p	OR
Constant	-3.82	1.03	13.66	0.00	0.02
Age					
(18 – 25)			9.69	0.05*	
26 - 35	0.44	0.45	0.93	0.34	1.55
36 - 45	0.47	0.51	0.82	0.37	1.59
46 - 55	-0.37	0.59	0.40	0.53	0.69
56 - 65	-1.94	1.00	3.70	0.05*	0.14
Gender					
(Female)					
Male	0.57	0.24	5.62	0.02*	1.76
Income					
(0 – 1,500TL)			17.46	0.00***	
1,501 – 3,000 TL	1.30	0.40	10.35	0.00***	3.65
>3,001 TL	1.96	0.47	17.46	0.00***	7.10

Marital Status					
(Single)					
Married	-0.77	0.29	6.93	0.01**	0.46
Education					
(Primary and Secondary School)			5.03	0.28	
High School	0.80	0.58	1.88	0.17	2.22
2 Year University	1.44	0.83	3.03	0.08	4.23
University	1.05	0.58	3.28	0.07	2.85
Master's or Ph.D.	1.25	0.63	3.95	0.05*	3.51
Profession					
(Banking Personnel)			14.73	0.01**	
Sole Proprietor	-1.31	0.68	3.72	0.05*	0.27
Public Sector Worker	-1.98	0.56	12.37	0.00***	0.14
Private Sector Worker	-1.47	0.55	7.01	0.01**	0.23
Retired	-1.47	0.79	3.45	0.06	0.23
Student	-1.93	0.70	7.70	0.01**	0.15
Comfort level with computers	0.54	0.10	29.27	0.00***	1.71
Previous experience of shopping online.	1.05	0.27	15.73	0.00***	2.87

Notes. Dependent variable: internet banking usage. OR = odds ratio, SE = standard error.
*p < 0.05 ; **p < 0.01; *** p < 0.001

3. Method

3.1. Sample

Demographic characteristics of the data are shown in Table1. The sample consisted of 483 respondents. A total of 52.2 percent of the sample were internet banking users and 47.8 percent were non-users. 47.6 percent were male and the rest were female.

3.2. Measures

Binary logistic regression was used to analyze the impact of age, gender, marital status, education, comfort level with computers and previous online shopping experience on the likelihood of using internet banking. The dependent variable was a dichotomous variable showing whether a person was an internet banking user or not. "Internet banking non-user" was coded as 0, whereas "internet banking user" was coded as 1. The dependent variables were demographic variables including age, gender, income, marital status, education and profession. Demographic variables were coded as categorical variables. In addition to the demographic variables, two additional predictors of internet banking usage were utilized: comfort level with computers (Table 2) and previous online shopping experience (Table 3). Respondents were asked to rate their comfort level with using computers on a Likert scale of 1-7 where 1 was "very uncomfortable" and 7 was "very comfortable". Moreover, respondents were asked whether they have ever shopped online. "No" was coded as 0 and "Yes" was coded as 1.

4. Logistic Regression Results

Table 4 shows the binomial regression results on factors predicting internet banking adoption. The full model was statistically significant (χ^2 (19) = 197.45, $p < 0.01$). Thus, the model was successfully able to distinguish between respondents who used internet banking and respondents who did not. The Cox and Snell R^2 value was 0.34, whereas Nagelkerke R^2 was 0.48. The model also correctly classified 76.2 percent of cases.

The results indicate that age was significantly linked with internet banking adoption ($p < 0.05$). However, only the β coefficient for 56-65 year olds was significant and negative. 56-65 year olds were 86 percent less likely to adopt internet banking compared to 18-25 year olds. Therefore, H1 is accepted.

The effect of gender on internet banking adoption was significant and positive. Males were 1.76 times more likely to use internet banking than females ($p < 0.05$). Therefore, H2 is accepted.

The strongest predictor of internet banking usage was income. Increasing income was associated with increased odds of adopting internet banking. Respondents whose income was between 1,501 – 3,000 TL were 3.65 times more likely to adopt internet banking compared to the respondents with an income level of 0 – 1,500 TL ($p<0.01$). Respondents whose income was more than 3,001 TL were 7.1 times more likely to adopt internet banking than respondents with 0 – 1,500 TL income ($p<0.01$). Therefore, H3 is accepted.

The results indicate that marital status was associated with internet banking adoption as well. Married individuals were 54 percent less likely to adopt internet banking ($p < 0.01$). Therefore, H4 is rejected.

There was no significant overall effect of education on internet banking adoption. However, the association of people with master's or Ph.D. degrees with internet banking adoption was significant and positive. Respondents with master's or Ph.D. degrees were 3.51 times more likely to adopt internet banking compared to primary and secondary school graduates ($p < 0.05$). Therefore, H5 is accepted.

The results show that professions were linked with internet banking adoption. The sole proprietors were 73 percent less likely to adopt internet banking compared to banking personnel ($p < 0.05$). Public sector workers were 86 percent less likely to adopt internet banking than banking personnel ($p < 0.01$). Private sector workers were 77 percent less likely to adopt internet banking than banking personnel ($p < 0.01$). Finally, students were 85 percent less likely to adopt internet banking compared to banking personnel ($p < 0.01$). Therefore, H6 is accepted.

Comfort level with computers and previous online shopping experience were also positively related to internet banking adoption. For every unit increase in comfort level with computers, an individual was 1.71 times more likely to use internet banking. Individuals who had shopped online previously were 2.87 times more likely to use internet banking compared to the individuals who had never shopped on line. Therefore, H7 and H8 are both accepted.

5. Conclusion and future studies

This study used a set of predictors to predict the likelihood of adopting internet banking with the help of logistic regression analysis.

The results show that mature adults were less likely to use internet banking than 18-25 year olds. Males and married individuals were less likely to use internet banking. The likelihood of adopting internet banking increased with increasing income and with people who had master's or PhD. Degrees. Banking personnel were more likely to adopt internet banking compared to sole proprietors, public sector workers, private sector workers and students. An increasing comfort level with computers and online shopping experience increased the likelihood of using internet banking.

Bank managers in North Cyprus should use the results of the present research to market internet banking services to those who are more likely to adopt internet banking. At the same time, promotional campaigns should be targeted to non-users so that they become users of internet banking. Computer classes should be provided by the banks to the customers to increase their computer comfort level.

Logistic regression analysis can be combined with fuzzy logic analysis to do similar studies in North Cyprus.

References

1. Celik H. What determines Turkish customers' acceptance of internet banking? *International Journal of Bank Marketing* 2008; **26**:353-370.
2. Devlin Y, Yeung M. Insights into customer motivations for switching to internet banking. *The International Review of Retail, Distribution & Consumer Research* 2003; **13**:375-92.
3. Gan C, Clemes M. A logit analysis of electronic banking in New Zealand. *International Journal of Bank Marketing* 2006; **24**: 360-383.
4. Gounaris S,Koritos C.Investigating the drivers of internet banking adoption decision.*International Journal of Bank Marketing* 2008;**26**:282-304
5. Hernandez J, Mazzon JA. Adoption of internet banking: proposition and implementation of an integrated methodology approach. *International Journal of Bank Marketing* 2007; **25**:72-88.
6. Kesharwani A, Bisht SH. The impact of trust perceived risk on internet banking adoption in India. *International Journal of Bank Marketing* 2012; **30**:303-22.
7. Karjaluoto H, Mattila M, Pento T. Consumer acceptance of internet banking: the influence of internet trust. *International Journal of Bank Marketing* 2002; **20**:261-72.
8. Kolodinsky J M, Hogarth J M, Hilgert MA. The adoption of electronic banking technologies by US consumers. *International Journal of Bank Marketing* 2004; **22**:238-259.

9. Krauter SG. Faullant R. Consumer acceptance of internet banking: the influence of internet trust. *International Journal of Bank Marketing* 2008;**26**:483-504.
10. Laforet S, Li X. Consumers' attitudes towards online and mobile banking in China.*International Journal of Bank Marketing* 2005;**23**:362-80.
11. Lassar WM, Manolis C, Lassar SS. The relationship between consumer innovativeness, personal characteristics, and online banking adoption. *International Journal of Bank Marketing* 2005; **23**:176-99.
12. Li H, Lai MM. Demographic differences and internet banking acceptance. *MIS Review* 2011; **16**:55-92.
13. Ozdemir S, Trott P, Hoecht A. Segmenting internet banking adopter and non-adopters in the Turkish retail banking sector. *International Journal of Bank Marketing* 2008; **26**:212-236.
14. Polasik M, Wisniewski TP. Empirical analysis of internet banking adoption in Poland. *International Journal of Bank Marketing* 2009; **27**:32-52.
15. Serener B. Effects of demographic characteristics and internet usage on risk perceptions of internet banking in Northern Cyprus. Paper presented at the 5th World Conference on Business, Economics and Management 12-14 May 2016, Kemer, Antalya, Turkey.
16. Vankatesh V. Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research* 2000; **11**:342-65.
17. Zhao AL, Lewis NK, Lloyd SH, Ward P. Adoption of internet banking services in China? Is it all about trust? *International Journal of Bank Marketing* 2010; **28**: 7-26.